

Policy Learning and Smart Specialization

Exploring Strategies for Regional Industrial Change

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Abstract

This paper seeks to explain what policy approaches and policy measures are best suited for promoting renewal and transformation in regional economies and what needs and possibilities there are for such policy to change and adapt to new conditions in order to remain efficient. The paper departs from the notion of Smart Specialization, which has become a popular strategy among policy makers recently. We discuss how regional smart specialization strategies influence regional path renewal and path creation and how they are related to and aligned with policy strategies implemented at other territorial scales (local, regional, national, supranational). We distinguish between different levels of policy learning and types of change in relation to path renewal and new path creation. Our main argument is that new regional growth paths require both stability and change within the support structure of the innovation system. Apart from being adaptive and tailor made for the specific preconditions of the regional economy, the regional system must also be resilient and predictable on certain dimensions. Unless smart specialization strategies are able to combine such adaptation and stability, they fail to promote path renewal and new path creation. Our arguments are illustrated with empirical findings from the regional innovation system of Scania, South Sweden.

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1 Introduction

Smart specialization strategies rank at the top of public policy agendas in many European regions. This new strategic policy approach “is about placing greater emphasis on innovation and having an innovation-driven development strategy in place that focuses on each region’s strength and competitive advantage. It is about specialising in a smart way, i.e. based on evidence and strategic intelligence about a region’s assets and the capability to learn what specializations can be developed in relation to those of other regions” (European Commission, 2011, p. 7). Smart specialization puts due emphasis on knowledge and innovation as core determinants of regional growth and development. In sharp contrast to old policy practices, which were often characterized by replicating successful policies adopted in other regions and “one-size-fits all” strategies (Tödtling and Trippl, 2005), smart specialization emphasizes the need for place-based policy strategies to promote economic diversification of regions (McCann and Ortega-Argiles, 2013; Boschma, 2014) by building on unique regional characteristics and assets. The identification and selection of prioritised areas for policy intervention are supposed to result from “entrepreneurial discovery processes”. The nature of entrepreneurial discovery processes in the policy context has been a subject of considerable discussions (Foray and Goenaga, 2013; Foray and Rainoldi, 2013; Asheim, 2014; Boschma, 2014). However, there is consensus that an inclusive approach to the identification of policy priorities (that is, multi-actor governance structures that ensure the participation of non-policy stakeholders in selecting areas for innovation policy) is eminently important for the successful design and implementation of smart specialization strategies.

Since smart specialization strategies draw on such entrepreneurial discovery processes, of which both preconditions and outcome are uncertain and unpredictable, it is widely claimed that their successful implementation, – i.e. innovation in industry – would require innovation also in the policy sphere (Borrás, 2011). Smart specialization strategies thus challenge traditional regional innovation policies in substantial ways and deviate from past policy practices. This paper advances the argument that such a reorientation of innovation policy is a demanding undertaking, requiring to overcome policy inertia and to engage in policy learning processes. At the same time we argue, however, that such new approaches also require stability and resilience on some dimensions of the policy system. This is because the new regional industrial path development, which the policy aims to stimulate, also requires predictability with regard to aspects such as return on investments and consequences of failures. A lack of possibilities for long term planning reduces the willingness of entrepreneurs to take risks related to experimentation, which hence is an argument in favour of institutional stability and resilient policy. At the same time, new path development leads to new types of economic activities in the region, with new needs and demands from the support system, which is an argument in favour of institutional change and policy renewal. Thus, unless smart specialization strategies manage to arrive at balanced combinations of change and stability in the policy system there is a risk that measures initiated to promote renewal instead will generate opposite effects and contribute to sustained lock in and reinforced path dependence.

The aim of this paper is to specify factors related to policy capabilities necessary for overcoming lock-ins that hamper regional industrial change. A crucial aspect for reaching such goals of renewal is the adoption (or introduction) of new policy approaches, in the literature referred to as ‘policy learning’. By assessing the preconditions for policy learning the paper thus presents an assessment of to what extent and how such policy learning can influence the capacity of regional economies to diverge into new growth paths. Empirical

observations from Scania, Southern Sweden (Trippel et al., 2015), which has been amongst the first regions in Europe that have integrated smart specialization ideas into their policy making processes, will be used to illustrate our theoretical arguments.

The paper is organized as follows. Section two draws on insights from evolutionary and institutional economic geography and provides a conceptualization of regional industrial change. We distinguish between two main forms of regional transformation, that is, path renewal and new path creation. In connection to this we conceptualize policy making as a strongly path dependent process, based on similar mechanisms as industrial path dependence. In section three we reflect on how policies aiming to stimulate new path development differ from “traditional” regional innovation policy approaches. In section four we advance the idea that both change and stability at various policy levels are eminently important for smart specialization strategies that aim at promoting new regional development paths. Section five provides a discussion of different types of change processes and highlights that not all of them are adequate for successful smart specialization strategies. Finally, section six summarizes the main arguments of the paper and draws conclusions.

2 Conceptualizing regional development and renewal

As stated in the introduction, smart specialization strategies aim at promoting regional industrial change, that is, the economic diversification of regional economies. It is thus worthwhile to take a closer look on what recent advances in economic geography, innovation studies and related fields have added to our understanding of how regions develop and transform over time. Insights into regional industrial change processes are eminently important to further discussions about the nature of policies for new path development and how they differ from traditional approaches.

We depart from theories in evolutionary and institutional economic geography¹ and the work that has been done on regional path dependence and new path development. The concept of path dependence is mainly used to explain the economic specialization of regions that includes lock-in effects that push a technology, an industry, or a regional economy, or its dominant policy agenda and industry support system, along one path rather than another (Strambach 2010).

Traditional accounts of path dependence had a strong focus on explaining the continuation and persistence of regional industrial structures and restrictive lock-ins. More recent work goes well beyond these old approaches and seeks to provide conceptualizations of regional industrial change and path development. A distinction between three main forms of regional industrial path development, that is, path extension, path renewal and new path creation, is suggested (Tödtling and Trippel, 2013; Isaksen, 2014; Isaksen and Trippel, 2014)². Path extension reflects continuity and lock-in. Path renewal and new path creation, in contrast,

¹ For an overview on other approaches see, for instance, Storper (2011).

² It is important to note that the three main forms of regional industrial path development may co-exist in regions (see, for instance, Tödtling and Trippel, 2013). Furthermore, it must be emphasized that this typology is not exhaustive. Other types of paths such as intentional path defence or extension, unintended path dissolution, or breaking a path without creating a new one (Sydow et al. 2012) may also exist. Strambach (2010: 407) points to the potential plasticity of paths ‘which describes a broad range of possibilities for the creation of innovation within a dominant path of innovation systems’. The author argues that radical innovation can take place within an existing path and institutional setting and does not necessarily result in breaking out of the path and the creation of a new one.

point to changes that follow from different forms of reorientation of regional industrial structures (Garud et al. 2010; Martin 2010, 2012; Neffke et al. 2011; Boschma 2014).

Path extension occurs through incremental product and process innovations in existing sectors and well-established technological paths. Such *intra-path changes* may in the long run result in stagnation and decline due to a lack of renewal (Hassink 2010). Regional industries are then locked into innovation activities that take place along restricted technological paths limiting their opportunities for experimentation and space to manoeuvre into more radical forms of innovation. Such situations may reflect high connectivity between regional actors and a low connectivity to the outside world. Ultimately, this erodes regional competitiveness and can lead to *path exhaustion*. Path dependence and path extension may not only be observed in the knowledge exploitation subsystem (production structure) of regional innovation systems but also in other subsystems (Morgan 2013; Tödtling and Trippl 2013). Much of the current debate in EEG and smart specialization, however, focuses only on the firm and industry level, ignoring that path reinforcing and lock-in processes (as well as new phenomena of new path development, see below) are also at work in other subsystems. Moreover, well-established linkages between the production structure, the knowledge infrastructure and the support structure increase the likelihood that path extension processes within each of these subsystems become tend to reinforce each other.

Path renewal takes place when existing firms and industries switch to different but related activities and sectors. This is in line with the notions of regional branching and related diversification (Boschma and Frenken, 2011; Boschma, 2015) and combinations of knowledge bases (Asheim et al., 2011; Strambach and Klement, 2012). The opportunities for path renewal are strong when a region's industrial structure exhibits related variety (Frenken et al., 2007) or shows high potentials for combinations of knowledge bases (Asheim et al. 2011). Such conditions are assumed to be conducive to inter-industry learning and new recombination of knowledge. Regions may then develop new growth paths 'as new industries tend to branch out of and recombine resources from existing local industries to which they are technologically related' (Boschma 2015: 738). This implies that knowledge and other resources that reside in regional firms will shape the type of renewal that occurs (Neffke et al. 2011). Path renewal is often industry driven as regional industries mutate and widen the industrial structure (Boschma and Frenken 2011). Also such renewal processes should be seen in relation to the correspondent development in the policy sub-system of the regional innovation system – path renewal within these subsystems might reinforce each other.

New path creation denotes the most wide-ranging changes in a regional economy. It corresponds to unrelated diversification (Boschma, 2015) and includes the establishment of new firms in entirely new sectors for the region or the introduction of radical innovations (products that are new to the market). New path creation is often research driven and fuelled by the commercialisation of research results and the foundation of new firms and spin-offs. The emerging path may not be 'related to the existing regional industrial base' (Henning et al. 2013: 1353). Path creation is not considered in the regional branching and related variety approaches, and the importance of research for the development of new growth paths marks the main difference between path renewal and path creation. Path creation often requires active policy interventions and the creation of organisational and institutional support structures (Tödtling and Trippl, 2013). Furthermore one could argue that the degree of entrepreneurial experimentation is more pronounced in processes of new path creation as compared with path extension and path renewal, which also calls for renewal in the policy sub-system of the regional innovation system. Situations of policy lock-in or dominant and

rigid paths of policy evolution in the regional support system will hardly foster renewal in the innovation system as a whole. However, as argued above, such wide-ranging changes in a regional economy which new path creation indicate, is also associated with a high degree of uncertainty which, we argue, at the same time calls for some degree of stability in policy domain.

Recent academic work suggests that regions and regional innovation systems (RIS) differ considerably in their capacity to stimulate new regional industrial path development (Isaksen and Trippl, 2014). Isaksen and Trippl extend evolutionary economic geography with an institutional perspective and (2014, p. 1) contend that different types of regions ‘... tend to transform themselves in different ways; i.e., they can be expected to embark of different development paths’. The authors argue that thick and diversified RIS provide favourable conditions for new path development due to the strong presence of related variety, different knowledge bases, knowledge generating organisations and academic entrepreneurship. However, they may exhibit weak structures for path extension brought about by a limited industrial production (exploitation) capacity. A too strong focus on and use of assets and resources for knowledge exploration and new path development can lead to a decrease in knowledge exploitation capacity, resulting in fragmentation problems. Organisationally thick and specialised RIS have rather weakly developed RIS structures for supporting new regional industrial path development. They mainly support path extension but face the risk of path exhaustion if positive lock-in turns into negative lock-in. Path renewal may also be triggered by the inflow of non-local knowledge and its combination with the highly specialized assets available within the region. Organisationally thin RIS have a limited capacity of promoting path extension and thus they have to deal with the danger of path exhaustion (although for different reasons than organisationally thick ones).

Explanations to these tendencies can be found partly in the general abilities of innovation policy in respective regions and partly in the composition of the knowledge base upon which such regional innovation policy have to build. With regard to general abilities, it is natural that organizationally thin RIS implies a less developed support structure and, thus, less ability to promote change and development in either direction. Due to this, the already dominant actors of the system will have a stronger influence on the future direction than those actors representing new paths. With regard to the composition of the knowledge base upon which the regional innovation policy builds it is also natural that thick and diversified regions offer more potential for new combinations and therefore also stronger capacity to initiate measures in support of new path creation. Thick and specialised RIS, on the other hand, may have equally strong general capacity of initiating change and development, but the regional knowledge base is less diverse and dominated by fewer fields of knowledge which makes the potential for new combinations more limited. Also, these regions are more likely to suffer from lock in due to vested interests among powerful incumbent actors.

This underlines that the degree of path dependence and renewal in the respective subsystem of a regional innovation system should be seen as correspondent and mutually reinforcing. The recent debate on smart specialization and contextual policy interventions has highlighted the crucial role played by the quality of government and sub-regional institutional capacity for socio-economic development and its promotion through new policy strategies (Charron et al., 2014; Rodriguez-Pose et al. 2014; Dawley et al. 2015).

Policy path dependence and policy lock in may have different sources, related both to the general abilities and the composition of knowledge bases in the policy domain. Morgan

(2013) sheds light on factors such as anachronistic skill-sets, inert and risk-averse compliance culture of government, the fact that learning from mistakes is not a political priority, and the orientation of politicians on short-term electoral cycles are found to severely curtail the capacity of policy actors to promote new growth paths. In addition to these factors, policy path dependence may also be the outcome of particular multi-actor and multi-level governance settings. The former relates to interactions between policy actors and other regional stakeholders in policy networks and the well-known phenomenon of “policy lock-in” (Grabher, 1993; Hassink, 2010). The limited capacity to fashion new regional industrial path development is then the result of a conservative culture of co-operation among key stakeholders who actively oppose regional industrial and policy changes to protect their vested interests.

Finally, failures to engage in successful coordination processes with other spatial levels may be a core factor that potentially hampers the capacity of regional policy actors to undertake interventions that support regional industrial change. This relates to issues of multi-level governance and regional autonomy and the need to align regional policies with those implemented at local, national and supra-national policy scales. Regions may engage in innovative experiments but more often than not funding from higher policy levels is required to provide the long-term support necessary for nurturing and sustaining new growth paths (Martin et al., 2015). Likewise, implementation of such experimentation would require facilitative instruments also on a local scale, especially in a Nordic context where a lot of policies influencing people’s everyday lives are organized on a local (municipality) scale. If regions fail to align their policy initiatives with national or European ones to ensure that they are reinforcing or complementary to each other (Zukauskaitė, 2014), or if regional initiatives are lacking correspondent support at the local level, the opportunities for promoting regional industrial change will be limited. Thus, policy coordination across spatial scales and sectorial domains, or what sometimes is referred to as “holistic” innovation policy (Edquist, 2014) is key to successful innovation policy.

3 Towards a new generation of regional innovation policy

Whereas European regional innovation policy during the past couple of decades has focused strongly on promoting regional specialization of current industry strongholds largely based on a science-push strategy, there are reasons to claim that such an approach is insufficient for promotion of path renewal and new path creation in most regions. Failure to adapt to the specific context in which it is applied, or failure to design holistic innovation policies characterized by sound policy coordination across spatial scales and sectorial domains, has resulted in attempts of promoting industries in regions where the basic preconditions for such are absent or in regional systems which are disconnected from the rest of the economy. Such priorities of supporting specialized (often science-based and/or “creative”) industries have gradually moved attention away from more traditional, generic, policy strategies for human capital development, competence building, resource mobilisation and wealth redistribution. In recent years, however, there has been a development away from such specialization towards more broad-based and diverse policy measures, sometimes referred to as platform strategies (e.g. Cooke, 2007). Not least in light of the above referred awareness that different RIS hold different preconditions for regional industrial change such broad based and diverse policy approaches have proved necessary, and the one-size-fits-all model influencing early generations of RIS policy has been widely rejected (Tödtling and Trippel, 2005).

The Nordic countries were among the forerunners in the adoption of highly specialized cluster-policy in the 1990s, which grew strong in the aftermath of the widespread decentralisation process through which the regional and local policy level gained autonomy in most European countries (e.g. Borrás and Tsagdis, 2008). While this shift of regional mandate generated positive effects in terms of better capacity of adapting policy to regional needs and demand there are also negative signs, especially when it comes to maintaining the balance between diversity and specialization, with strong priority given to the latter. While such specialization in principle would be positive, the tailor made approach necessary to realize potential from specialization was often lacking. In the 1990s and early 2000s Silicon Valley and Route 128 were prime sources of inspiration for cluster policies worldwide (e.g. Saxenian, 1994); some years later many regions invested heavily in trying to promote regional hubs of life science research and development inspired by other global success stories such as San Diego and Munich (e.g. Cooke, 2005). Many of these best practice strategies however failed to adapt their measures to the specific industrial and institutional context of the region where they were implemented, which made them less efficient. In addition to such lack of context sensitivity, research has shown that there is a risk that specialized cluster policies contribute to regions being locked-in and overly focused on currently successful but declining sectors while new path development is hardly realized (e.g. Hassink, 2010).

Research on regional innovation policy has highlighted these problems and called for both more tailor made and more broad based strategies for regional innovation (e.g. Tödtling and Trippel, 2005; Asheim et al, 2011; Nauwelaers and Wintjes, 2002). While these two aims at first sight may seem contradictory, they unite on the central claim that innovation policy must be direct and specific if it is to stimulate change (Asheim et al., 2011). To some extent such direct and specific measures implies a picking winners approach; however combined with the equally central idea of broad-based platforms rather than narrowly defined fields of specialization it rather allows winners to pick themselves. Research in this field has had an impact also on policy agendas in European regions during the past decade, a trend that accentuated with the launch of smart specialization strategies following the Horizon 2020. Although the “smartness” of smart specialization strategies primarily refers to putting greater emphasis on each regions specific strengths and competitive advantage, in practice this means, at least for “ordinary regions” that specializations and broadness are combined. Thus, as opposed to the specialized (cluster) strategies of the 1990s in which best practice approaches not always were adapted and translated to the real preconditions of the regions in which they were implemented, the “smartness” of smart specialization strategies are geared towards doing exactly this. This means that general insights from best practice cases observed in another context not necessarily have to be rejected because regional preconditions are different, but adapted to cater for such new context.

Also in this shift from clusters policy to smart specialization the Nordic countries can be seen as forerunners. Finland was instrumental in shifting focus from science-based specialization strategies (in the policy sphere referred to as “Centres of Excellence”), which dominated their regional innovation policy from the 1990s onwards, towards broad-based policy measures yet still with a preference for high-tech industries and applications (Asheim et al, 2011). The new Finnish national policy for regional development has partly abandoned the sector and technology oriented strategy and adapted their policy programs to include strong elements of demand-based and user-driven perspectives. Among the most recognized examples of this new approach is the SHOKs programme (Strategic Centres for Science, Technology and Innovation) in which the Finnish government appointed thematic areas of high priority rather than specific industries or sectors. The underlying rationale for this new approach is both an

awareness of the non-linear nature of innovations (i.e. not all innovations are science based) and partly recognition of the fact that traditionally defined sectors not always properly reflects economic activities in a dynamic society. Recent evaluations of SHOKs however showed limited success so far (Läthenmäki-Smith et al, 2013). Also Swedish regional innovation policy was until recently strongly focused on Centres of Excellence (e.g. through the so called VINNVÄXT program) but has gone through a change process which led to embracement of related variety as the way forward, most visibly manifested in the national program on Strategic Innovation Areas (SIO). In similarity with SHOKs, this programme transcends sectorial as well as geographical boundaries and focuses instead on thematically defined problems and opportunities. However, despite their less strictly defined geographical focus, these policy approaches still manifests themselves through regionally oriented concrete policy measures and are thus important elements of new regional innovation policy.

Another feature of the new generation of regional innovation policy is an increased awareness of regional innovation systems being functionally open and globally connected systems. Since there are hardly any regional industries or economies any longer, and hardly any regional markets (except for some very specific parts of the service economy), regional policy aiming to promote path renewal and new path creation is increasingly dependent on policies initiated, controlled and implemented elsewhere. Furthermore, given the increased awareness of related variety as a crucial source of industry dynamics and economic transformation, sector focused policies become obsolete unless they are adapted to this new reality. There is therefore a need for policy coordination both across spatial scales and across industrial domains. A challenge for regional innovation policy is thus both the previously highlighted need for being place-based and context specific, and at the same time being adapted to and in line with policies at other levels of society. Such coordination implies taking into account exogenous sources of path development (e.g. industry specific trends which can be both in line with and contrary to the regionally desired development) in the local strategies, and making regional strategies correspondent to strategies implemented elsewhere. Failure to do so may very well work on a regional level in a short term perspective, but when such attempt of new path creation are to be up-scaled lack of policy coordination and adaptation can prove to be major obstacles (e.g. Coenen et al, 2015).

The “smartness” of smart specialization strategies thus is both, as touched upon above, tied to the identification of strongholds in the regional economy which are worth exploiting further through entrepreneurial experimentation, to the ability for policy to renew in correspondence with the industrial renewal it is set out to stimulate, and to the coordination across systems with various sectorial orientation and geographical configuration. The literature (e.g. Geels, 2005) refers to the latter in terms of “system innovation” as opposed to “system optimisation”. There are basically two underlying arguments in favour of system innovation as a strategy for promoting path renewal and new path creation. Firstly, even though actors in a regional economy may be innovative, it is not certain that this innovativeness will influence the overall development of the regional economy in any direction of renewal (path renewal and new path creation). On the contrary, this innovativeness may rather work in a direction of incremental change on an aggregated level or even stagnation and lock-in to established paths (path extension, path exhaustion). Secondly, even though the actors in the regional system may be innovative and develop their activities in entirely new fields (which thus would favour path renewal and new path creation) there might be path reinforcing tendencies stemming from influences on other spatial scales. Smart specialization strategies aiming to promote path renewal and new path creation must thus take such extra-regional influences into account.

Furthermore, the direct and specific policy measures aimed to contribute to renewal of existing strongholds in a regional economy are by default more easily accessible for already favoured actors because these have a stronger general capacity to benefit from such, and their knowledge base composition is in most cases attuned to, or even part of, those strongholds. If such actors have vested interests in established technologies and already existing modes of organisation (e.g. due to sunk investments) they have by default less incentives for contributing to change and renewal (Battilana, 2006; Moodysson and Sack, 2014). From an innovation policy point of view it is therefore crucial to reach a wider target that already dominant actors of the regional economy. New path creation calls for involvement of new entrants representing alternative fields. In the literature these are sometimes referred to as new niche experiments (Rip and Kemp, 1998; Schot and Geels, 2008). Opening up pathways for such renewal to flourish requires not only a well-suited support structure in the region but also wider institutional framework conditions (Coenen et al, 2015). Such institutional framework conditions can be regionally based (e.g. culture, entrepreneurial spirit) but are more often defined at other territorial scales (e.g. national regulations, global industry standards etc.).

While regionally based smart specialization strategies hardly can influence such extra-regional factors directly, they can at least relate to them and let them influence the measures carried out in the region. It is also possible that successful regional renewal activities will set in motion wider change by adding new layers to the extra-regional institutional framework, yet these processes are slow and calls for resilient regional policy measures (further elaborated below). Thus, “strategic intelligence about a region’s assets and the capability to learn what specializations can be developed in relation to those of other regions” (European Commission, 2011, p. 7) implies a need for coordination not only between regions (i.e. exploiting competitive advantages) but also across spatial scales in a more comprehensive meaning.

Nauwelaers and Wintjes (2002) provided an overview of traditional innovation policy instruments used by policy makers in different regions. Those can be classified according to the target level of support – individual firms or the system as a whole – and according to the focus of support – input resources such as R&D subsidies for firms and collaborative projects or behavioural value-added such as match-making, network facilitation and innovation coaching. The risk with such policy portfolio is that it might lead to a picking-winners strategy when supporting individual firms and/or to too generic support for the whole system where actors’ needs and heterogeneity of the industries are neglected (see also Moodysson and Zukauskaitė, 2014).

Smart specialization strategy differs from traditional tools for innovation policy when it comes to the level of support. Instead of focusing on a few firms or industries or promoting the region as a whole, it is based on priority areas that are defined through a collective discussion with the actors from different domains. The selection of areas is based on market and technology knowledge, must represent existing strengths and new possibilities in the region as well as open up for many actors rather than a few entrepreneurs in order to achieve structural change (Foray, 2015). When it comes to the focus of support, smart specialization strategies in many aspects are similar to other types of innovation policies. For priority areas to develop there is a need for both hard and soft instruments such as funding, networking activities, and consultations. However, since the definition of priority areas is a collective process where many actors are supposed to be involved, soft tools are not primarily geared to changing attitudes and behavioural values, but rather serve as facilitators for new collaboration possibilities.

4 Towards a balance between policy change and policy stability

A key question that emanates from the discussion above is how to overcome policy inertia and lock-in on the one hand, and provide long-term stability for new regional industrial path development on the other hand. Policy learning and change are prerequisites for the renewal of innovation systems and the emergence of new growth paths (Lundvall, 2010; Borrás, 2011). However, frequent and abrupt policy changes create insecurity among entrepreneurs and other stakeholders and prevent them from planning their activities and investments in efficient ways. Especially when it comes to radical change in regional development leading to a new path creation, there is a need for policy stability and continuity. Upscaling of new technologies and modes of production into commercialization involves high risk taking and usually investment schemes lasting for several decades. When the rules of the game are unstable this may create a deadlock situation in which everyone is aware of the potential for renewal but no one dares to make the required investments. An example of this is the attempt of promoting green technologies in the Swedish forest industry which, due to unstable policy situation, so far have not reached a breakthrough despite well-developed technological capacity to do so (Coenen et al, 2015).

Policy learning refers to the process in which knowledge and experience can be used for improving the development of policy formulation and implementation (Borrás, 2011). In other words, policy learning is a purposive policy change process which may also include elements of stability. This goes in line with the idea of smart specialization strategies which are understood as conscious efforts to guide regional development based on competences and resources present in the region. Thus, developing a smart specialization strategy may involve substantial policy learning processes since it requires the identification of certain domains in the regional economy which have the potential for knowledge spill-overs and scale as well as the capacity to be original and distinctive (Foray et al., 2011).

Borrás (2011) elaborates on three levels of policy learning – government learning, policy network learning, and social (governance) learning (Table 1). The first one (government learning) is primarily related to learning in public government bodies in innovation systems such as regional governments. Such actors have administrative capacity and consciously seek new knowledge in order to manage innovation policy activities in a better way.

Policy network learning, in contrast, includes not only public governmental organizations, but also other stakeholders in innovation policy who aim to learn more about the innovation system as a whole and possibly identify strengths and weaknesses of the system. Traditionally, such networks resemble Triple Helix constellations consisting of universities, firms and governmental bodies in the region. However, recently, especially in the context of the smart specialization debate, the need to include civil society actors such as patient organizations, consumer groups, non-governmental organizations (Quadruple Helix) has been highlighted.

Learning at the social (governance) level includes an even larger group of actors who are not automatically associated with innovation policy (such as media). Learning at this level requires the capacity to reflect on state-economy-civil society relations and could lead to shifts in innovation policy paradigms. When it comes to regional innovation policy (as in the case of smart specialization strategies) such a shift is less likely to occur if solely regional

actors are involved in the learning process. Many regions do not have enough resources to promote a new innovation policy paradigm that is not supported by the processes at national and/or global levels. Learning at this level is crucial in order to avoid coordination failures between regional, national and supra-national policy making processes.

Table 1: Levels of Policy Learning

Levels of policy learning	Who learns	Learning about what	Organizational capacity	Policy change
Government learning	Government and public-related organizations in the innovation system	Organisational practices/processes (administrative, management failures)	Administrative capacity	Innovation policy management change
Policy network learning	Networks of stakeholders in innovation policy	Innovation system (identifying systemic failures)	Analytical capacity	Innovation policy programme change
Social (governance learning)	Socio-economic actors in the political system	State-economy-civil society relations related to innovation and diffusion processes (innovation systems' overall governance failures)	Major reflexive and institutional capacity	Innovation policy paradigm shift

Source: Borrás (2011, p. 730)

Drawing on the insights outlined above, we advance the argument that new regional industrial path development requires policy learning at all three levels. Changes in the innovation policy paradigm create *preconditions* for both *path renewal* and *new path creation*. A well-known example for a new policy paradigm is related to the emergence of the knowledge economy. Policy attention has moved away from the promotion of price-based competition towards support for high value-added knowledge intensive activities. This change in paradigm has underpinned the design of new public innovation policy programmes that focus on the upgrading of traditional industries through ‘injecting’ new knowledge as well as the support for entirely path renewal and new path creation. The shift from clusters to smart specialization areas as policy targets is another example for learning at the social level. The case of Scania is telling in this respect, reflecting a major policy reorientation from traditional cluster approaches towards platform policies that seek to stimulate knowledge flows across industries and sectors. Although smart specialization (as well as cluster) strategies are developed at the regional level, they have been highly influenced and promoted by policy processes at the other spatial scales.

There are strong reasons to assume that learning at the policy network level is eminently important for regional smart specialization strategies. Discovering possibilities for new path development calls for policy networks that bring together a variety of stakeholders such as established firms and stakeholders (i.e. the ‘usual suspects’) as well as newcomers. Established actors have a good knowledge about the history of the region, its past and current strengths and weaknesses, whilst newcomers represent new possibilities for path development. In addition, non-regional actors (like representatives from other regions and/or

the national level) could be included to provide an outsider perspective as well as to facilitate coordination with policy processes taking place elsewhere. This is especially relevant for thin RIS and for thick and specialized RIS (see section 2) in order to overcome the lack of variety of actors, resources and knowledge at the regional level. Furthermore, learning can only take place if established (powerful) actors are open to new ideas and if mechanisms are in place that enable to take into account ideas by newcomers.

In the case of Scania, the establishment of a Research and Innovation Council (FIRS) paved the way for network learning processes. FIRS was responsible for developing Scania's smart specialization strategy ('An international innovation strategy for Skåne 2012-2020'³). The council consists of a large variety of actors including the regional government (Region Skåne), several larger municipalities, Lund University, Malmö University College as well as representatives of firms located in the region. Drawing on a rich evidence base⁴ FIRS identified and prioritized three areas with high potentials for new path development: personal health, smart materials and smart & sustainable cities. Health care is a well-established sector in Scania representing one of its core strengths. Linking this sector to the IT industry (e-health) and city planners (better access to health) is seen as a promising opportunity for path renewal. The platform 'smart materials', in contrast, represents an entirely new domain in the regional economy, which could have its origin in the establishment of big science facilities currently built in Scania. These areas mentioned above (as well as the platform 'smart & sustainable cities') are promising in terms of scale, scope and knowledge spill-overs and they are distinctive and unique when it comes to the future development of the region. Thus, they are well in line with the idea of smart specialization as suggested by Foray et al. (2011).

Learning at the government level implies a better management of innovation policy. Learning at this level alone cannot support new regional industrial path development. Having well-functioning administrative practices in place is only a necessary but not a sufficient condition for promoting regional industrial change.

Focusing on Scania reveals a rather strong degree of policy path dependence at the government level. In this case study region it is Region Skåne (regional government) that is primarily responsible for the implementation of the smart specialization strategy. For each prioritized area (see above) coordinators have been employed to oversee and guide the path development process. One of the main tools those coordinators plan to use in this regard is a creation of physical meeting places to facilitate networking between the relevant actors in the three areas. Since the implementation of the smart specialization strategy is still in its early stage, it is hard to say if these tools will bring the expected results. However, in the past policy support programs in Scania have been criticized for their overemphasis of networking activities at the expense of other types of support (see Martin et al., 2011; Moodysson and Zukauskaitė, 2014; Zukauskaitė and Moodysson, 2014). Furthermore, the approach to employ coordinators has been criticized by several key stakeholders who described this approach (i.e. to implement a strategy by employing new people) as a standard element in Region Skåne's policy repertoire. Some other stakeholders would have preferred direct investments into the prioritized areas in the form of funding. This suggests that in the case of Scania learning at the government level is rather slow. The regional government continues managing innovation

³ Scania does not have a separate smart specialization strategy, but its international innovation strategy is developed taking into account the ideas of smart specialization.

⁴ In their work, FIRS members used inputs from previous studies on regional (innovation) development done by consultant companies and researchers from universities in Sweden and abroad.

programmes by using mainly the same tools as in the past regardless the criticism that was raised by other actors and academic observers (Martin et al., 2011).

As indicated above, new regional industrial path development does not only require policy change and policy learning processes but also policy stability. Innovation policy paradigms (social level) tend to be rather stable over longer periods of time. Once in place, their sustainment requires long-term stability and planning in the field of policy. However, since their emergence involves mobilization of actors from different organizational domains (society, economy, state) at different geographical levels (interplay between global, national, and regional levels), changes in paradigms are not likely to happen quickly and often.

As noted above, government learning mainly addresses changes at the administrative level. It improves the efficiency of existing innovation policies and as a consequence, changes and adaptations usually do not have a negative impact on new path development activities but are rather a necessary condition for such activities to flourish.

The biggest challenge to balance between stability and change can be found at the policy network level and relates to innovation policy programmes. There is a need to revise the innovation policy programme if it is not making the expected impact or to adapt it to changing context conditions. However, as mentioned above, new regional industrial path development (particularly new path creation) is a slow and long-term process. An abrupt change of policy priorities and tools might jeopardize path development. One way to address this challenge is to include a variety of stakeholders in the policy process. Apart from facilitating learning at the network level (see above), a broad inclusion of stakeholders allows for taking into account multiple perspectives when decisions about changing (or keeping) innovation programmes have to be taken. Policy networks require a certain degree of stability and continuity in terms of their members to build up trust, to develop a shared understanding of challenges and potential solutions and to establish routines for communication and decision-making. Too much stability, however, could lead to the well-known phenomenon of policy lock-in. A variety of actors and the occasional inclusion of new ones is needed to prevent the risk of lock-ins since 'traditional suspects' tend to have the same world view and might resist industrial transformation or introduce only cosmetic changes when developing smart specialization strategies. A wide inclusion of actors is, however, only possible in the regions with a high quality of governance. Otherwise, there is a risk that vested interests, corruption and poor law enforcement hamper the possibilities for taking multiple perspectives into account.

Scania's smart specialization strategy can serve as an example for highlighting how a large variety of regional stakeholders aim to balance between stability and change. Over the past years, Scania has focused on supporting innovation in sectors such as IT/new media, life, science, and food (see also Henning et al., 2010). Especially when it comes to IT/new media, food, and life science there have been many efforts to promote new path development by linking these industries to the knowledge infrastructure in the region and by creating new support organisations. Scania's current innovation strategy reflects a shift away from sector specific support. However, the priority areas identified by FIRS, might lead to path renewal where these sectors further develop via intersection with each other. In addition, entirely new domains, in particular in the field of smart materials, are also part of the region's smart specialization strategy. Thus, the support for traditionally strong sectors is preserved although in a different form, while new path creation is also promoted. The prioritised areas in Scania's innovation strategy may also reflect the composition of members in the policy network FIRS.

Although it is the main stakeholders ('usual suspects') of the RIS who make up this council, many of them have not been selected based on their 'belonging' to certain organisations or sectors but based on their knowledge of key challenges for Scania's RIS and their understanding of and interest in regional innovation (Miörner, 2015). This holds in particular true for the actors who represent firms and industries in FIRS. In other words: the composition of the policy network has thus far proved to be a well-functioning mechanism to avoid lock-in.

5 Forms of policy change

Policy change might take different forms, ranging from abrupt shifts to small revisions and gradual developments. The literature on institutional change provides tools for conceptualizing and categorizing different types of change that are highly relevant for enhancing one's understanding of the nature of policy change processes¹. As will be argued below, not all forms of change are equally adequate for smart specialization strategies that aim to promote new regional industrial path development.

Mahoney and Thelen (2010) distinguish between four types of institutional change processes: displacement, layering, drift and conversion. Displacement means that existing rules are replaced by new ones. It might happen as an abrupt radical shift in case of revolutions and major changes of policy regimes. However, it might also take place as a gradual displacement when older rules are slowly replaced by new ones. Displacement is most often introduced by actors who suffer from the existing rules. Arguably, in the case of innovation policy gradual displacement is more likely than abrupt radical shifts. Old programmes for innovation might exist in parallel with new ones, which benefit new, emerging group of actors and development paths. As more and more actors benefit from new innovation policy programmes the old ones become obsolete and disappear.

Layering takes places when new rules are added to the existing ones. It involves amendments, revisions and additions to the existing set of rules. Most often it occurs when challengers of the original institutional setting do not have the power to change the whole system. As a consequence, they tend to work within the established system and introduce modifications to the existing core set of rules (Mahoney and Thelen, 2010). However, from a policy learning perspective, the players who introduce such modifications are not necessarily different from those who originally developed the policy strategy as they often have the capacity to identify and 'fix' failures in innovation policy (Borras, 2011).

In the cases of drift and conversion the formal rules remain the same. Conversion means that actors are consciously looking for ambiguities in the system and exploiting them for their own advantage (new interpretation of rules). Change processes through drift, in contrast, mean that the outcome of the rule is different due to changes in the context where it is applied (Mahoney and Thelen, 2010). It follows that those who apply/use policies are the ones involved in a learning process rather than those who develop it. Since actors operate within existing policy frameworks, such processes are less likely to bring any major changes in regional development but rather promote the extension of existing paths.

New path creation and path renewal are most likely to be promoted via displacement or layering since these two forms of change are associated with new (or improved) policy frameworks allowing different types of actors to use and benefit from innovation policies.

They also facilitate finding a balance between stability and change in the policy framework since they allow for continuity of previously developed programmes and the introduction of new ones. In Scania, for instance, a range of industry support organizations such as Medicon Valley Alliance (life-science), Media Evolution and Mobile Heights (IT/New Media) Skånes Food Innovation Network have been established in the past. Those organizations continue providing support for their members whilst contributing at the same time to the creation of new specialization areas (such as personal health) rather than being entirely replaced by new combinations. The risk with such gradual displacement processes is that old programmes do not disappear fast enough even if they become obsolete and drain resources from new co-existing ones with negative implications for new path development.

An example of change via layering includes ongoing efforts in Scania to incorporate service based innovations into the innovation strategy. Traditionally regional innovation policy in Scania has been strongly oriented on promoting research-based innovation, exploiting the strengths in the knowledge generation subsystem. This has, however, resulted in a neglect of service- and public sector-based innovations (Kontigo, 2012). To address this challenge, new projects have been launched, which focus in particular on the health care sector. Concrete examples include attempts to improve the quality of food served for patients and to introduce e-health system solutions. These activities are at the core of the smart specialization platform 'personal health'. Research-based innovations are still important in regional innovation policy. However, new focus areas have been added to the existing support structure.

6 Conclusions

There is an agreement in the current debate on innovation policy and smart specialization that the promotion of new development paths requires substantial policy innovations and novel approaches that deviate in many respects from past practices. Departing from the insight that path dependence is not only a core feature of economic processes but is also at work within the public policy sector, unlearning of old policy routines and engaging in policy change processes have been portrayed as key preconditions for supporting new industrial growth paths.

This paper sought to enhance our understanding of the nature of policy changes and policy inertia and the ways by which they potentially affect path renewal and new path creation in regional innovation systems. Our contribution was threefold. First, we went beyond simple conceptualizations of policy change by suggesting a differentiated multi-level perspective on such processes. Inspired by Borrás (2011) work on various levels of policy learning, we advanced the idea that the successful adoption of smart specialization strategies requires government learning, policy network learning and governance learning. We have shown that learning on each of these three levels serves different functions, ranging from the creation of basic preconditions for implementing smart specialization strategies to facilitating collective discovery processes and securing an efficient management of innovation programmes.

Second, in sharp contrast to current accounts of policy path dependence, which mainly emphasise its dark side, we highlighted that a certain degree of policy stability has also several positive aspects and forms a prerequisite for regional industrial change. Policy stability provides the predictability entrepreneurs need to take risks and engage in experimentation processes. The core argument put forward in this paper has been that a

balance of policy change and policy stability is required for nurturing and maintaining new industrial growth paths.

Third, we sought to build a deeper conceptual analysis of the ways by which policy changes can take place. Applying Mahoney and Thelen's (2010) typology of institutional change, we argued that new regional industrial path development may benefit in particular from 'gradual displacement' of old policy programmes by new ones and 'layering' (modification of existing programmes and support structures) as these forms facilitate the required balance between policy stability and change.

Arguably, there are many unresolved issues that deserve due attention in future research. A core question that needs to be addressed is how policy change and stability affect new path development in different types of regions. In this paper, we used empirical evidence from Scania – an institutionally thick and diversified well-performing region – to illustrate our conceptual arguments. Drawing on a broader evidence base that also includes regions with less-developed innovation systems may lead to some conceptual refinements and better insights into the nature of policy learning that is required to successfully adopt smart specialization strategies for regional industrial change in a variety of European regions.

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ⁱ We apply Mahoney and Thelen (2010) framework as a useful typology for analyzing change processes. We would like to point out that conceptually policy change and institutional change are not the same. Policies, especially innovation policies, seek to change institutions in the region such as establish new norms supporting knowledge exchange, positive attitudes to innovation and trust. However, if they lead to such a change in the institutional framework differs from case to case (see also Martin et al., 2011)